

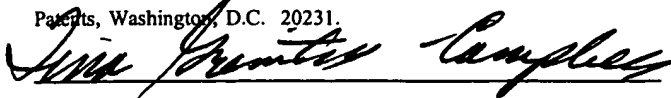
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## APPENDIX E

"EXPRESS MAIL" Mailing Label Number EI267842785US

Date of Deposit October 24, 1997

I hereby certify under 37 CFR 1.10 that this correspondence is being deposited with the United States Postal Service as "Express Mail Post Office To Addressee" with sufficient postage on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.



Tina Grimstead-Campbell

# APPENDIX E

## Example Loading And Execution Control Program

```
public class Bootstrap {

    // Constants used throughout the program
    static final byte BUFFER_LENGTH      = 32;
    static final byte ACK_SIZE           = (byte)1;
    static final byte ACK_CODE           = (byte)0;
    static final byte OS_HEADER_SIZE     = (byte)0x10;
    static final byte GPOS_CREATE_FILE   = (byte)0xE0;

    static final byte ST_INVALID_CLASS    = (byte)0xC0;
    static final byte ST_INVALID_PARAMETER = (byte)0xA0;
    static final byte ST_INS_NOT_SUPPORTED = (byte)0xB0;
    static final byte ST_SUCCESS          = (byte)0x00;

    static final byte ISO_COMMAND_LENGTH = (byte)5;
    static final byte ISO_READ_BINARY    = (byte)0xB0;
    static final byte ISO_UPDATE_BINARY   = (byte)0xD6;
    static final byte ISO_INIT_APPLICATION = (byte)0xF2;
    static final byte ISO_VERIFY_KEY      = (byte)0x2A;
    static final byte ISO_SELECT_FILE     = (byte)0xA4;

    static final byte ISO_CLASS           = (byte)0xC0;
    static final byte ISO_APP_CLASS       = (byte)0xF0;

    public static void main () {

        byte pBuffer[] = new byte[ISO_COMMAND_LENGTH];
        byte dBuffer[] = new byte[BUFFER_LENGTH];
        byte ackByte[] = new byte[ACK_SIZE];
        //short fileId;
        short offset;
        byte bReturnStatus;

        // Initialize Communications
        _OS.SendATR();

        do {
            // Retrieve the command header
            _OS.GetMessage(pBuffer, ISO_COMMAND_LENGTH, ACK_CODE);

            // Verify class of the message - Only ISO + Application
            if ((pBuffer[0] != ISO_APP_CLASS)
                && (pBuffer[0] != ISO_CLASS)) {
                _OS.SendStatus(ST_INVALID_CLASS);
            }
            else {
                // go through the switch
                // Send the acknowledge code

                // Verify if data length too large
                if (pBuffer[4] > BUFFER_LENGTH) {
                    bReturnStatus = ST_INVALID_PARAMETER;
                }
                else
                {
                    switch (pBuffer[1]) {
                        case ISO_SELECT_FILE:
                            // we always assume that length is 2
                            if (pBuffer[4] != 2) {
                                bReturnStatus = ST_INVALID_PARAMETER;
                            }
                            else
                            {
                                // get the fileId(offset) in the data buffer
                                _OS.GetMessage(dBuffer, (byte)2, pBuffer[1]);
                                // cast dBuffer[0..1] into a short

```

```

        offset = (short) ((dbuffer[0] << 8) | (dbuffer[1] & 0x00FF));
        bReturnStatus = _OS.SelectFile(offset);
    }
    break;

case ISO_VERIFY_KEY:
    // Get the Key from the terminal
    _OS.GetMessage(dbuffer, pBuffer[4], pBuffer[1]);

    bReturnStatus = _OS.VerifyKey(pBuffer[3],
                                   dbuffer,
                                   pBuffer[4]);

    break;

case ISO_INIT_APPLICATION:
    // Should send the id of a valid program file
    _OS.GetMessage(dbuffer, (byte)1, pBuffer[1]);
    // compute fileId(offset) from pBuffer[2..3] via casting
    offset = (short) ((pBuffer[2] << 8) | (pBuffer[3] & 0x00FF));
    bReturnStatus = _OS.Execute(offset,
                                   dbuffer[0]);

    break;

case GPOS_CREATE_FILE:
    if (pBuffer[4] != OS_HEADER_SIZE) {
        bReturnStatus = ST_INVALID_PARAMETER;
        break;
    }
    // Receive The data
    _OS.GetMessage(dbuffer, pBuffer[4], pBuffer[1]);
    bReturnStatus = _OS.CreateFile(dbuffer);
    break;

case ISO_UPDATE_BINARY:
    _OS.GetMessage(dbuffer, pBuffer[4], pBuffer[1]);
    // compute offset from pBuffer[2..3] via casting
    offset = (short) ((pBuffer[2] << 8) | (pBuffer[3] & 0x00FF));
    // assumes that a file is already selected
    bReturnStatus = _OS.WriteBinaryFile (offset,
                                           pBuffer[4],
                                           dbuffer);

    break;

case ISO_READ_BINARY:
    // compute offset from pBuffer[2..3] via casting
    offset = (short) ((pBuffer[2] << 8) | (pBuffer[3] & 0x00FF));
    // assumes that a file is already selected
    bReturnStatus = _OS.ReadBinaryFile (offset,
                                           pBuffer[4],
                                           dbuffer);

    // Send the data if successful
    ackByte[0] = pBuffer[1];
    if (bReturnStatus == ST_SUCCESS) {
        _OS.SendMessage(ackByte, ACK_SIZE);
        _OS.SendMessage(dbuffer, pBuffer[4]);
    }
    break;
default:
    bReturnStatus = ST_INS_NOT_SUPPORTED;
}
}
_OS.SendStatus(bReturnStatus);
}
}
while (true);
}
}

```

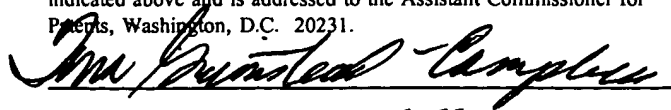
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## APPENDIX F

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# APPENDIX F

## Methods For Accessing Card Operating System Capabilities In The Preferred Embodiment

```
public class _OS {

    static native byte      SelectFile      (short   file_id);
    static native byte      SelectParent    ();
    static native byte      SelectCD        ();
    static native byte      SelectRoot      ();

    static native byte      CreateFile      (byte     file_hdr[]);
    static native byte      DeleteFile      (short   file_id);

    // General File Manipulation
    static native byte      ResetFile        ();
    static native byte      ReadByte        (byte     offset);
    static native short     ReadWord        (byte     offset);

    // Header Manipulation
    static native byte      GetFileInfo      (byte     file_hdr[]);

    // Binary File support
    static native byte      ReadBinaryFile  (short   offset,
                                             byte     data_length,
                                             byte     buffer[]);
    static native byte      WriteBinaryFile (short   offset,
                                             byte     data_length,
                                             byte     buffer[]);

    // Record File support
    static native byte      SelectRecord    (byte     record_nb,
                                             byte     mode);
    static native byte      NextRecord      ();
    static native byte      PreviousRecord  ();

    static native byte      ReadRecord      (byte     record_data[],
                                             byte     record_nb,
                                             byte     offset,
                                             byte     length);
    static native byte      WriteRecord     (byte     buffer[],
                                             byte     record_nb,
                                             byte     offset,
                                             byte     length);

    // Cyclic File Support
    static native byte      LastUpdatedRec  ();

    // Messaging Functions
    static native byte      GetMessage      (byte     buffer[],
                                             byte     expected_length,
                                             byte     ack_code);
    static native byte      SendMessage     (byte     buffer[],
                                             byte     data_length);
    static native byte      SetSpeed        (byte     speed);

    // Identity Management
    static native byte      CheckAccess     (byte     ac_action);
    static native byte      VerifyKey       (byte     key_number,
                                             byte     key_buffer[],
                                             byte     key_length);
    static native byte      VerifyCHV       (byte     CHV_number,
                                             byte     CHV_buffer[],
                                             byte     unblock_flag);
    static native byte      ModifyCHV       (byte     CHV_number,
                                             byte     old_CHV_buffer[],
                                             byte     new_CHV_buffer[]);
}
```

```

static native byte      GetFileStatus      (byte unblock_flag);
static native byte      SetFileStatus      (byte file_status);

static native byte      GrantSupervisorMode ();
static native byte      RevokeSupervisorMode();

static native byte      SetFileACL         (byte file_acl[]);
static native byte      GetFileACL         (byte file_acl[]);

// File context manipulation
static native void      InitFileStatus     ();
static native void      BackupFileStatus   ();
static native void      RestoreFileStatus  ();

// Utilities
static native byte      CompareBuffer      (byte pattern_length,
                                             byte buffer_1[],
                                             byte buffer_2[]);

static native short     AvailableMemory     ();
static native void      ResetCard           (byte mode);
static native byte      SendATR             ();
static native byte      SetDefaultATR       (byte buffer[],
                                             byte length);
static native byte      Execute            (short file_id,
                                             byte flag);

// Global state variable functions
static native byte      GetIdentity         ();
static native byte      GetRecordNb        ();
static native short     GetApplicationId    ();
static native byte      GetRecordLength    ();
static native byte      GetFileType        ();
static native short     GetFileLength      ();
static native void      SendStatus          (byte status);
}

```